

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 38

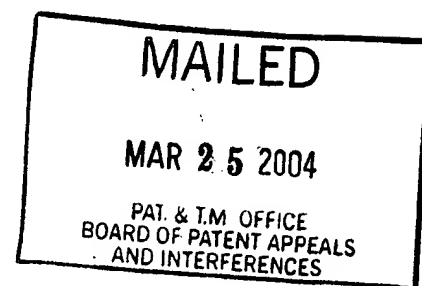
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TZYH-CHYANG CHERNG and YU ZHANG

Appeal No. 2004-0168
Application 09/160,991

HEARD: March 4, 2004



Before FRANKFORT, STAAB, and BAHR, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 22, 24 through 27 and 29 through 31, all of the claims remaining in this application. Claims 23 and 28 have been canceled. In addition, at the oral hearing held March 4, 2004, appellants' counsel withdrew the appeal as to claims 17 through 19. Therefore, the appeal as to claims 17

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through 19 is DISMISSED. This leaves only the examiner's rejections of claims 1 through 16, 20 through 22, 24 through 27 and 29 through 31 for our consideration on appeal.

Appellants' invention relates to a method of forming a cutting die including a die body and an integral blade formed thereon by scanning a laser beam along a path on the die body surface corresponding to a desired blade pattern, and introducing a selected metal alloy powder into the heated area of the die body surface to build up an integral blade of high-grade, and hard-to-wear material on the relatively softer metal die body. The final blade shape is formed by milling, grinding or electro discharge machining (EDM). Independent claims 1, 13, 16, 20, 21 and 22 are illustrative of the subject matter on appeal and a copy of those claims may be found in the Appendix to appellants' brief.

The prior art references of record relied upon by the examiner as evidence of obviousness of the claimed subject matter are:

Baker	3,952,179	Apr. 20, 1976
Cox et al. (Cox)	5,417,132	May 23, 1995
Maybon	5,580,472	Dec. 3, 1996

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Claims 1 through 7, 10, 12 through 14, 16, 20 through 22, 24, 27 and 29 through 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Maybon.

Claims 8, 9, 11, 15, 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Maybon as applied above, and further in view of Cox.

Reference is made to the examiner's answer (Paper No. 29, mailed January 28, 2003) for the reasoning in support of the above-noted obviousness rejections and to appellants' brief (Paper No. 28, filed December 13, 2002) and reply brief (Paper No. 33, filed April 2, 2003) for appellants' arguments thereagainst.

OPINION

Preliminary to discussing the rejections on appeal, we note that on page 8 of the brief appellants have indicated that all of the rejected claims on appeal "should be grouped as one group." Accordingly, we have selected independent claim 1 as being representative of appellants' "one group" and will decide the

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appeal on the basis of that claim alone, with claims 2 through 16, 20 through 22, 24 through 27 and 29 through 31 standing or falling based on our determination with regard to claim 1.

In arriving at our decision on the obviousness issues raised in this appeal, we have given careful consideration to appellants' specification and claims, the teachings of the applied prior art references, the secondary evidence made of record, and the respective positions advanced by appellants and the examiner. Upon evaluation of all of the evidence before us, it is our conclusion that the examiner's above-noted rejections under 35 U.S.C. § 103(a) will be sustained. Our reasoning for this determination follows.

Independent claim 1 on appeal reads as follows:

1. A method of forming a cutting die including a die body and an integral blade extending outwardly from a surface of said die body, the method comprising the steps of:

cladding a blade material onto an area of said die body surface by heating said area with a laser, introducing said blade material into the heated area while heating said area, and building a blade of said blade material outwardly from said

surface, wherein said blade material is compositionally different and of greater hardness than a base material forming said die body surface; and

shaping the clad blade.

The examiner's rejection of claim 1 is under 35 U.S.C. § 103(a) and relies upon the collective teachings of Baker and Maybon. Baker, like appellants, is seeking to provide an improved method of producing a rotary cutting die without the need to machine away a substantial portion (e.g., 80-90%) of the surface metal of a cylindrical die blank to a substantial depth in order to create the needed raised cutting edges/blades on the cutting die (col. 1, lines 8-38 and col. 2, lines 49-66). To that end, Baker discloses a method wherein a cylindrical die blank (10) of a nominal size and formed of a relatively inexpensive steel tubing is provided with a "weld bead" (12) applied on the peripheral surface in a configuration corresponding to a desired raised cutting blade. See Figure 1 of Baker. Although Baker does not use the terminology, it is clear that the "weld bead" (12) therein is "clad" on the outer surface of the cylindrical die blank (10). The weld bead is preferably formed of a more expensive, harder, more abrasive resistant and

longer wearing alloy material (such as cobalt based tungsten carbide) and applied to the peripheral surface of the die blank by an automatic, tape-controlled machine, so as to insure that the weld bead is precisely and accurately located and will conform exactly with the configuration of the cutting edges as determined by a master design layout (col. 3, lines 34-38). After the weld bead has been applied, the die blank is placed in a grinding machine and the peripheral surface of the weld bead is ground down to provide a uniform peripheral working surface (Figs. 4-5). Thereafter, as shown in Figure 7, the die blank is electrical discharged machined to remove excess weld bead material and to form a desired cutting edge (14). Advantages attained by the above-noted manner of fabricating a cutting die are set forth in column 4, lines 41-58 of Baker.

Although Baker describes application of the weld bead (12) by use of an automatic, tape-controlled machine and controlled movement of the die blank past a welding head to form the weld bead on the die blank surface along lines corresponding precisely to a design layout, the patentee provides no specific guidance as to the exact form of machine or weld head employed to form the weld bead (12). Thus, the examiner has found that Baker is

silent about the heat source used for cladding the bead on the die blank (answer, page 4) and concludes that it thereby differs from appellants' method as defined in claim 1 on appeal by failing to teach or suggest heating and welding or cladding with a laser.

To account for this difference between the teachings of Baker and the method claimed by appellants, the examiner turns to Maybon, noting that this patent teaches a method of applying/cladding a more expensive, harder, more abrasive resistant and longer wearing alloy material (containing tungsten carbide) to the outer peripheral surface of blades on a metal comminuting and defibering plate of a paper pulp refining machine by use of a precisely controlled laser resurfacing device (Fig. 3). More particularly, similar to the situation in Baker, Maybon teaches cladding of the harder alloy material onto a less expensive, relatively softer metal plate blank such that the upper part of the ridges or blades of the blank are built up from layers of the hard abrasion resistant material (Figs. 8-9) and thereby exploits the abrasion resistant properties of the harder alloy material at the comminuting surface of each of the blades

(see, e.g., col. 4, lines 46-59). Details of the laser cladding/welding operation in Maybon are described in the following manner in column 3, lines 7-32:

The method in accordance with the invention of manufacturing a paper pulp defibering or refining plate comprises a stage of laser resurfacing of the upper surfaces of the ridges of a plate body in a first material using a laser directing a laser beam onto an impact area scanned along the upper surfaces of the ridges to be resurfaced and associated with a powder spray nozzle directing onto the impact area of the laser beam a powder based on a hard abrasion resistant material and a brazing metal alloy adapted to be melted by the laser beam and to be brazed to said first material, adhering to the grains forming the hard abrasion resistant material powder, the laser beam having an intensity sufficient to melt the surface of the first material and to melt the brazing metal alloy powder in the area of impact.

Each ridge can advantageously be resurfaced in a number of successive passes during which the area of impact of the laser beam and of the powder is scanned along the entire length of the ridge in alternate directions, the laser beam being focused on each pass in an impact area slightly larger than the width of the ridge, the movement of the laser beam being reversed beyond the ends of the ridge. In this way the resurfacing thickness can be further increased.

The advantage of the method is that resurfacing can be carried out to produce a surplus thickness which is then reduced by machining to produce sharp lateral edges of the ridges again.

Advantages of the laser cladding method described in Maybon are set forth in column 7, line 41 thru column 8, line 11 and include accurate reproduction of the geometrical shape of the cutting portion of the ridges/blades, the plate body or blank (8) being little affected by the heating effect of the laser beam and thereby experiencing extremely small or even negligible distortion due to thermal expansion, an excellent metallurgical bond between the hard alloy material and the relatively softer metal of the blank, and a hard comminuting edge on each blade that is homogeneous, non-porous, and has a very fine microstructure within the hard alloy matrix.

Based on the combined teachings of the applied patents, the examiner has essentially concluded that it would have been obvious to a person of ordinary skill in the art at the time of appellants' invention to utilize the laser cladding process of Maybon and the well known laser heat source therein for cladding a hard alloy material bead onto the die substrate (10) of Baker for forming a cutting blade having the advantages of a very fine microstructure and homogeneity, as taught by Maybon.

Like the examiner, we find amply motivation and suggestion in the teachings of Maybon for using the laser cladding process described therein for applying a hard, more abrasion resistant alloy bead like that seen at (12) in Baker onto the die blank (10) of Baker and then machining the hard alloy bead to form the blades of Baker's rotary cutting die. As for appellants' arguments concerning the inability of welding technology to produce "near net shape blades" and the apparent need for extensive machining of such blades, we note that claim 1 on appeal has no requirement of initially forming "near net shaped blades" or with regard to any particular degree of machining necessary to shape the blades into a final blade configuration. If anything, in our opinion, appellants' evidence of the more crude nature of known welding techniques and the purported need in Baker for extensive rough and finish machining to conform the "weld bead" therein to a desired final cutting blade configuration would have provided one of ordinary skill in the art with added incentive for using the laser cladding technique of Maybon for applying the "weld bead" (12) of Baker to the die blank (10), since Maybon makes clear that the laser resurfacing process described therein has the advantage of accurate reproduction of the geometric shape of the resurfaced

ridges/blades, an excellent metallurgical bond between the hard alloy material and the underlying relatively softer metal of the blank, and provides a homogeneous, non-porous, abrasion resistant material at the cutting edge of the ridge or blade having a very fine microstructure and consequently excellent mechanical properties.

Appellants contentions of page 11 of the brief that Maybon does not teach ridge or blade forming "on a planar body surface from different material than the body" and that Maybon "specifically avoids forming the entire ridge of the abrasion resistant material, thereby teaching against the present invention," are unpersuasive of error on the examiner's part. In the first place, it is readily apparent from viewing Figure 8 of Maybon, and the description thereof, that the abrasion resistant material of the ridge or blade (e.g., layer 39) is applied on a planar body surface and is comprised of different material than the body. As for appellants' second argument, we find nothing in Maybon which indicates that the patentee "specifically avoids forming the entire ridge of the abrasion resistant material" or that this patent teaches away from appellants' invention. In our opinion, the disclosure at column 7, lines 41-46 of Maybon that

the plate body (8) is little affected by the heating effect of the laser beam and thereby experiences extremely small or even negligible distortion due to thermal expansion would have been understood by the ordinarily skilled artisan as applying to the entirety of the plate body (8), including the upstanding portion shown in Figure 8 which receives the hard alloy layers (39-43) on the upper surface thereof. Thus, contrary to appellants' position, although Maybon does not specifically show such an arrangement, there is nothing in this patent which affirmatively "teaches against full formation of the ridges by the laser" (brief, page 15).

As for appellants' secondary evidence, we have weighed it in reaching our determination that the subject matter of claim 1 on appeal would have been obvious to one of ordinary skill in the art at the time of appellants' invention based on the combined teachings of Baker and Maybon, and find that such evidence is entitled to little weight. Even if we accept the statement in the declaration of Mr. Paul Madill that the cutting dies mentioned in the testamentary letters from Mr. Gregg Harrison and

Mr. Graham Bell¹ were produced in accordance with the process or method set forth and claimed in the present application, we have no way to assess the significance of the essentially identical statements made by Mr. Harrison and Mr. Bell that such dies "produced by Bernal Technologies are superior to other cutting dies we are currently using" and that they have experienced "a longer life than with any other cutting dies," because we have no indication from either of the parties as to exactly what "other cutting dies" they were using or may be referring to. Thus, there is no factual basis on which to establish the superior results urged by appellants. Moreover, as the examiner has noted, appellants have provided no comparison between the closest prior art (i.e., Baker) and the claimed invention in attempting to establish superior results and long felt need. As for appellants' assertion regarding evidence of "commercial success and long felt but unsolved need" and the fact that such evidence purportedly has been ignored by the examiner without a careful analysis of its relevancy (brief, page 17), we find nothing in the record to factually establish either of these secondary

¹We note that appellants have incorrectly referred to these letters in their reply brief (e.g., page 11) as "declarations," which they clearly are not.

indicia of non-obviousness. In that regard, it is well settled that an attorney's argument in the brief cannot take the place of evidence and that arguments of counsel, unsupported by competent factual evidence of record, are entitled to little weight. See In re Payne, 606 F.2d 303, 315, 203 USPQ 245, 256 (CCPA 1979) and In re Pearson, 494 F.2d 1399, 1405, 181 USPQ 641, 646 (CCPA 1974). As a general proposition, we agree with the examiner's assessment of the secondary evidence as set forth in the final rejection (Paper No. 24, pages 3-4) and in the answer (pages 8-9).

Based on the totality of the evidence before us, we will sustain the examiner's rejection of representative independent claim 1 under 35 U.S.C. § 103(a) relying upon the collective teachings of Baker and Maybon.

As we noted supra, given appellants' grouping of the claims together as "one group" (brief, page 8), it follows that claims 2 through 16, 20 through 22, 24 through 27 and 29 through 31 will fall with claim 1. Thus, the examiner's rejection of claims 2 through 7, 10, 12 through 14, 16, 20 through 22, 24, 27 and 29 through 31 under 35 U.S.C. § 103(a) as being unpatentable over

Baker in view of Maybon and that of claims 8, 9, 11, 15, 25 and 26 under 35 U.S.C. § 103(a) as being unpatentable over Baker in view of Maybon and Cox, will also be sustained.

In addition to the foregoing, we also note our agreement with appellants' assessment of the collective teachings of Baker and Maybon as described on page 13 of the brief. That is, we agree with appellants that one possibility resulting from one of ordinary skill in the art applying the teachings of Baker and Maybon, as a whole, would have been a tubular cutting die with a bottom portion of each blade cast with the tubular die body, and the outer portions of the cutting blades formed of a harder, wear resistant alloy, using the laser cladding process generally taught by Maybon. However, unlike appellants, we do not see that claim 1, as an example, in any way defines over this method of forming a cutting die, since claim 1 merely requires cladding a blade material onto "an area of said die body surface" (e.g., the top surface of the cast blade portions noted above) by heating said area with a laser, introducing the blade material into the heated area while heating said area, and building a blade of the blade material outwardly from said surface, wherein said blade material is compositionally different and of greater hardness

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than a base material forming said die body surface, and then shaping the clad blade (all as taught by Maybon). Contrary to appellants' assertions, we do not see that claim 1, as an example, necessarily requires that the whole of the integral blade must be comprised entirely of the abrasion resistant material.

It follows from the foregoing that the decision of the examiner rejecting claims 1 through 16, 20 through 22, 24 through 27 and 29 through 31 of the present application is affirmed.

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

AFFIRMED

Charles E. Frankfort

CHARLES E. FRANKFORT)
Administrative Patent Judge)

Lawrence J. Staab

LAWRENCE J. STAAB)
Administrative Patent Judge)

BOARD OF PATENT

APPEALS AND

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INTERFERENCES

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